CROPS AND SOILS RESEARCH
IN COOPERATION WITH
WYE INSTITUTE

Department of Agronomy
Department of Horticulture
Agricultural Experiment Station
University of Maryland

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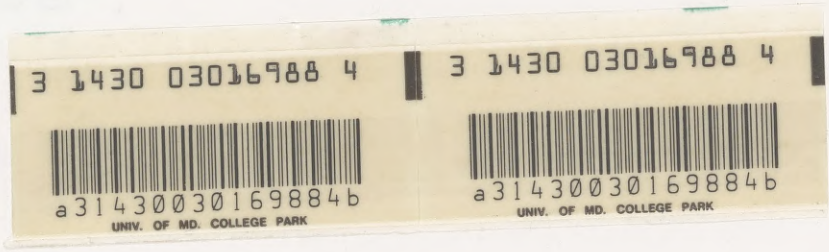
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Crops and Soils Research Program at Wye Institute

I. C. Haut, J. R. Miller, and F. C. Stark

The objective of the research program at the Wye Institute is to develop improved crop varieties and improved soil and crop management practices that result in more efficient crop production.

Research will be conducted on the following:

1. Evaluate and develop improved soybean varieties for the Eastern Shore of Maryland.
2. Evaluate corn and small grain varieties for Eastern Shore.
3. Evaluate and develop improved varieties of red clover.
4. Evaluate and develop improved varieties of snap beans.
5. Evaluate and develop improved varieties of strawberries.
6. Evaluate and develop improved varieties of tomatoes for fresh market and for processing.
7. Evaluate new hybrids, varieties and breeding lines of sweet corn and other truck crops for adaptation to the Eastern Shore.
8. Investigate the potential of new industrial crops (Oil, pulp, insecticides, etc.).
9. Investigate rate, placement and time of application of fertilizers for improved corn and soybean production.
10. Study plant food requirements of ornamental shrubs and trees for optimal growth and winter hardiness.
11. Investigate the influence of deep plowing, subsoiling, and other tillage practices on soil properties and crop yields.
12. Investigate practices for enhancing growth and yield of vegetable crops.
13. Investigate practices for enhancing growth of ornamental plants in field and can culture.
14. Develop new chemical and cultural methods for controlling weeds in corn and soybeans.
15. Investigate response of selected ornamental plants to herbicides.
16. Study moisture use by crops and methods for increasing efficiency of water usage in crop production.
17. Evaluate and develop new soil test and plant analysis procedures.

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The Response of Corn to Monoammonium Phosphate (MAP) and to Ammonium Polyphosphate (APP) Using Several Different Methods of Placement

V. A. Bandel
Department of Agronomy

Purpose and Objectives

1/ To compare the effectiveness of MAP and APP on corn yields and on rate of emergence.

2/ To compare plant uptake of P from MAP and from APP at two stages of growth -- at 20 to 25 days after emergence and at the silking stage.

3/ To compare the effectiveness of two corn fertilizers on yield, emergence and phosphorus uptake when plowed down, when placed in a band 2 inches to the side and 2 inches below the seed, or when placed in direct contact with the seed.

Procedure

A split plot design was used in which phosphorus sources were the main plots and placement methods were the sub-plots. There were 2 phosphorus sources used (MAP and APP), 5 placement treatments, and a phosphorus check. With 5 replicates, there were a total of 60 plots with each measuring 15 by 50 feet. The treatments are listed in Table 1.

The plow-down fertilizer was applied on April 10 and plowed down on April 12. On April 19, DeKalb XL-45 corn was seeded in 30 inch rows at an anticipated population of 24,000 plants per acre. The soil temperature was about 52 degrees F at seeding time. Atrazine was applied at about 2 pounds per acre as a pre-emergence weed control.

The corn was sidedressed with nitrogen at a rate of 75 lbs/A on June 29 when about 24 inches tall. Whole plants were harvested on July 5 and analyzed for phosphorus content. Leaf samples were taken at silking stage for chemical analysis. Grain was harvested on September 28 and yields were recorded.

Results

Rate of emergence was not noticeably affected by any of the treatments. However, when the corn was approximately 6 to 12 inches tall, that corn which had received some starter fertilizer in direct contact with the seed was slightly taller than the other corn. The final plant population was not influenced by phosphorus source or method of placement (Table 2).

Similarly, the treatments had no effect upon early uptake of phosphorus or potassium or upon grain yields (Tables 3, 4, and 5). In fact, in no case was there any response to phosphorus.

Summary

The results of this project indicated, tentatively, that corn will not respond to ammonium polyphosphate any better than it will respond to monoammonium phosphate. But, this was not a conclusive test since no response to phosphorus occurred.

Phosphorus and potassium uptake and grain yields were not influenced by placement. This was partially due to the high fertility level of the soil. Also, since the plant population was relatively low for the variety used, sufficient stress may not have been placed on the soil to cause differences which might have otherwise occurred. The poor population was due partly to extremely cold, wet conditions early in the season and excessive soil crusting. This project will be continued for at least one more year at the same location.

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Table 1. Fertilizer treatments.

Tmt. No.	P. D. 1/	Band	Pop-Up	S. D. 2/	P Source
1	70-115-125	-----	-----	75-0-0	MAP
2	70-0-125	-----	-----	75-0-0	MAP
3	70-0-125	-----	3-12-3	75-0-0	MAP
4	55-55-110	15-60-15	-----	75-0-0	MAP
5	70-115-125	-----	3-12-3	75-0-0	MAP
6	55-55-110	15-60-15	3-12-3	75-0-0	MAP
7	70-115-125	-----	-----	75-0-0	APP
8	70-0-125	-----	-----	75-0-0	APP
9	70-0-125	-----	3-12-3	75-0-0	APP
10	55-55-110	15-60-15	-----	75-0-0	APP
11	70-115-125	-----	3-12-3	75-0-0	APP
12	55-55-110	15-60-15	3-12-3	75-0-0	APP

1/ Plow down. 2/ Sidedress. 3/ MAP - monoammonium phosphate, APP - ammonium polyphosphate.

Table 2. The effect of phosphorus source and fertilizer placement on corn plant population.

Phosphorus Source*	Placement* 1/7	2/8	3/9	4/10	5/11	6/12	Ave.
	Plants/Acre (1000/A)						
MAP	13068	16117	14375	15246	15246	13939	14375
APP	15246	14375	14375	13068	13068	15246	14375
Ave.	13939	15246	14375	13939	13939	14375	14375

*See Table 1 for explanation of treatments

Table 3. The effect of phosphorus source and fertilizer placement on phosphorus content of corn plants approximately 30 inches tall.

Phosphorus Source*	Placement* 1/7	2/8	3/9	4/10	5/11	6/12	Ave.
	%						
MAP	0.34	0.33	0.32	0.33	0.33	0.32	0.33
APP	0.33	0.32	0.33	0.33	0.34	0.33	0.33
Ave.	0.34	0.32	0.32	0.33	0.34	0.32	0.33

*See Table 1 for explanation of treatments.

Table 4. The effect of phosphorus source and fertilizer placement on potassium content of corn plants approximately 30 inches tall.

Phosphorus Source*	Treatment* 1/7	2/8	3/9	4/10	5/11	6/12	Ave.
	%						
MAP	3.9	3.9	3.6	3.5	3.5	3.8	3.7
APP	3.4	3.5	3.5	3.4	3.2	3.9	3.5
Ave.	3.6	3.7	3.6	3.4	3.4	3.8	3.6

*See Table 1 for explanation of treatments.

Table 5. The effect of phosphorus source and fertilizer placement on corn grain yields (15.5%H_2O)

Phosphorus Source*	Treatment* 1/7	2/8	3/9	4/10	5/11	6/12	Ave.
	bu/A						
MAP	107.3	106.9	101.6	108.1	102.4	98.9	104.2
APP	109.9	105.7	107.3	96.4	102.8	104.5	104.4
Ave.	108.6	106.3	104.4	102.2	102.6	101.7	104.3

*See Table 1 for explanation of treatments.

The Response of Corn to Different Rates and Placement of Zinc Fertilizer

C. B. Coffman and J. R. Miller
Department of Agronomy

Purpose and Objectives

Zinc deficiency has been observed in a few corn fields on the Eastern Shore of Maryland. This deficiency occurs during the early stages of growth and is associated with high soil phosphorus levels, cold-wet soils, and a pH greater than 6.5. The question is often asked if zinc fertilizer should be applied in the row or in the broadcast application to correct zinc deficiency. The objective of this experiment was to determine the uptake of zinc by corn when the zinc fertilizer was applied in the row versus broadcast and plowed down.

Procedure

The experiment was established on a Mattapex silt loam. An analysis of the soil by the University of Maryland Soil Testing Laboratory showed a pH of 6.1, magnesium-high, phosphate-high, and potash-medium. The available zinc (Zn) in the soil as determined by the 0.1N HCl acid method was 0.9 ppm.

The experimental area was limed on April 4 with 1 ton of ground limestone per acre which contained 30% calcium oxide (CaO) and 20% magnesium oxide (MgO). On April 6, 140-70-70 (lbs/A of $N\text{-}P_2O_5\text{-}K_2O$) was broadcast and plowed down with the following rates of zinc fertilizer applied as zinc sulfate: 0, 2.5, 5, 10, 20, 40, and 80 lbs. per acre. The corn variety PAG Sx29 was planted on May 2 in 30-inch rows. To give a comparison with the zinc fertilizer that was broadcast, the same rates of zinc were also applied in the row. In addition, the plots received a row application of 25-50-50. All fertilizers applied in the row application were placed 2 inches to the side and 2 inches below the seed. The experiment was designed as a randomized complete block and the fertilizer treatments were replicated four times.

Due to the cold-wet soil conditions in early May, a rather poor stand of corn was obtained in the plot area. Corn plants were taken from the plots on July 7 for a chemical analysis. The plants were approximately 24 inches tall at this time. The corn samples were dried, ground, wet-ashed and analyzed for zinc with the atomic absorption spectrophotometer.

Results

The contents of zinc in the corn-tissue samples receiving the different treatments of zinc fertilizer are given in Table 1. It can be noted that, in general, the zinc content of the corn increased as increasing rates of zinc fertilizer were applied to the soil. It appears that the row application of zinc fertilizer was more effective than the broadcast application for supplying zinc to the corn plants. This is probably due to the zinc being more soluble in the acid band of fertilizer in the row application. When the zinc fertilizer is broadcast it comes in contact with a larger volume of soil and its availability to the corn plant is not as great.

Research conducted at other experiment stations has indicated that zinc deficiency is not prevalent until the corn plant contains less than 15 ppm of zinc. The level of zinc in the corn plants grown on this soil indicates that an adequate quantity of zinc was available in the soil.

Summary

1. The application of zinc fertilizer increased the amount of zinc in the corn plants.
2. The row application of zinc fertilizer appeared to be more effective than the broadcast application for supplying zinc to the corn plants.
3. The level of zinc in the corn plants grown on the soil receiving no zinc fertilizer appeared to be adequate for satisfactory growth.

Table 1. The effect of rate and placement of zinc fertilizer on the zinc content of corn plants grown on Mattapex silt loam.

Zinc Treatment		Zinc Content of Corn Plants
Row	Plow Down	
Lb/A	Lb/A	ppm
0	0	32
2.5	0	36
5	0	43
10	0	47
20	0	47
40	0	62
80	0	65
0	2.5	32
0	5	39
0	10	34
0	20	43
0	40	50
0	80	61

Effect of Black Polyethylene Plastic on Corn Yields and Water Use

J. E. Foss, E. Strickling, and R. J. Cominsky
Department of Agronomy

Purpose and Objectives

As a result of the increasing concern of water for agriculture, considerable emphasis has been placed on water conservation or increasing the efficiency of water usage in crop production. Investigators have used evaporation-retardant chemicals, mulches, and plastic films for control of evaporation from the soil surface. This is just one of the numerous methods being studied to decrease the amount of evapo-transpiration for a crop.

The objectives of this preliminary investigation were: (1) study the crop response from plastic-covered plots and (2) investigate the soil moisture relationships under conventional, fallow, and plastic-covered plots through the major part of the growing season.

Procedures

The plots were located on a nearly level Mattapex silt loam. This soil, with a moderately well drained profile, has 32 to 48 inches of silty materials over a sandy substratum. A weather station located within 100 feet of the plot area provided rainfall and temperature data.

Treatments included in the experiment were:

A Conventional corn plots
B Plastic-covered corn plots
C Fallow
D Fallow, plastic covered

The corn was planted on May 3, 1967, and the black polyethylene plastic (4 mil) was applied on May 31 when the corn was about 3 inches in height. The plastic covered the entire plot area; small holes were provided in the plastic for the corn plants. Plastic tape was used to seal the plastic around the corn plants.

Soil-moisture measurements were made on duplicate plots by the neutron probe method. Pipes 52 inches in length were placed in the center of the 10 x 20 foot plots. Measurements of soil moisture were begun on June 14.

Results

Visual observations of the corn plots during the growing season showed a definite response to the plastic covering. Increased growth was noted one week after

application of the plastic, and the plastic-covered corn plots matured one to two weeks ahead of the conventional plots. Higher soil temperatures in the covered plots was probably the main factor influencing the increased growth throughout the season. Air temperatures in this area for May, June, July, and August were 5.2, 0.7, 1.6, and 1.7 degrees below normal, respectively.

Yields from the conventional and plastic covered plots are given in Table 1. The covered plots have yields comparable to the conventional plots. Although yields tended to be higher for the plastic covered plots, statistical analyses indicated differences were not significant.

Data on soil moisture and precipitation are given in Figures 1, 2, and 3. Water was found to be removed from the soil profiles during the growing season to depths of at least 48 inches. Some of this removal is the result of the corn crop and evaporation, while water removal lower in the profile is probably the result of drainage or water table fluctuations. Recharge in both the covered and conventional plots occurred after the 8 inches of precipitation on August 4 and 5. This heavy precipitation apparently did not effectively recharge soil water below 30 inches, however. The difference in moisture contents of the covered and conventional plots in the beginning of measurements probably reflects variations in the physical properties of the soils. Recharge of soil moisture on October 5 shows similar levels as those on the respective plots for June 14 (Fig. 2).

It should be emphasized that the plastic cover was not successful in keeping rainfall out of the corn plots. This was especially noted during the heavy rains of August. Leakage apparently took place around the corn plants and in holes torn in the plastic. Heavier plastic (8 mil) could probably be used to improve the quality of the cover. In future studies, the plot position could also be improved by selecting an area of 1 to 2% slope rather than the level area used in 1967.

Summary

A preliminary study of soil moisture on conventional, fallow, and plastic-covered plots was conducted on Mattapex silt loam. The major results are summarized below:

1. On the plastic-covered corn plots, yields tended to be higher than the conventional plots. Increased growth and earlier maturity on the plastic-covered plots are probably attributable to increased temperatures.
2. Plastic-covering techniques need improvement to eliminate water from entering the plot area. A slope of 1 to 2% would probably be preferred for this type of study. Soil-moisture measurements should begin earlier in the season for more meaningful results.

3. Temperature data of the soil would be of great benefit in evaluating the influence of plastic on the growing crop.
4. Recharge of soil water by precipitation during June, July, and August of 1967 in the plots occurred primarily in the upper 30 inches.
5. Measurements of water-table fluctuations in the plot area would aid in evaluating moisture contents at depths of 50 inches or more.

Table 1. Corn yields and stands on conventional and plastic covered plots in Queen Annes County, Maryland in 1967.

Treatment	Yield* bu/acre	Coeff. of Var. %	Stand plants/acre
Conventional	127.7	5.1	15,348
Plastic covered	141.2	7.6	16,553

*Data are means of 3 replications. No significant difference was noted between yields (t-test, 5% level). Significance was obtained at the 10% level, however.

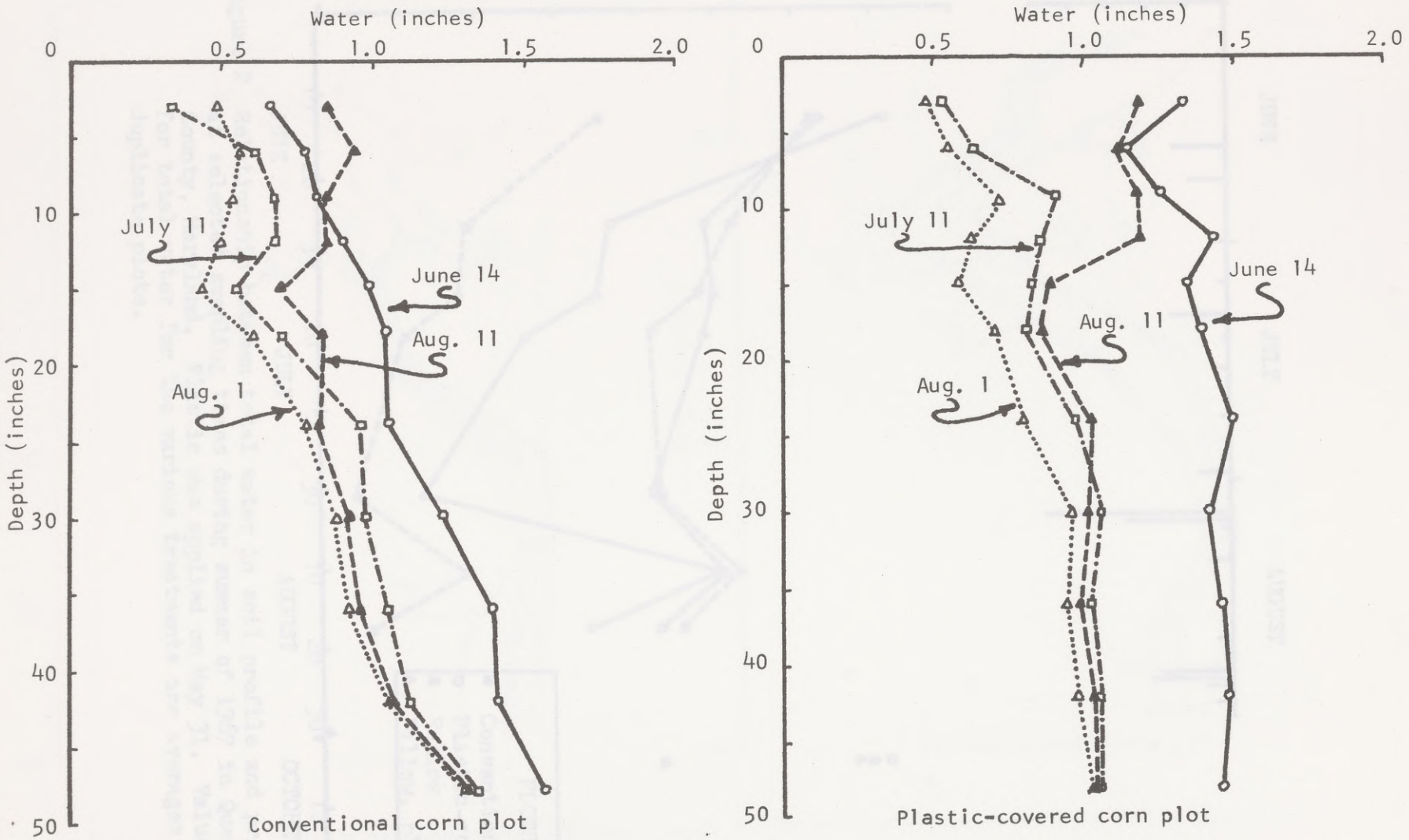

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Figure 1 Relationship between water and soil depth in conventional and plastic-covered corn plots in Queen Annes County, Maryland in 1967.

Depth (inches)
Water (inch)
Electric-conveyed corn plots
Conventional corn plots

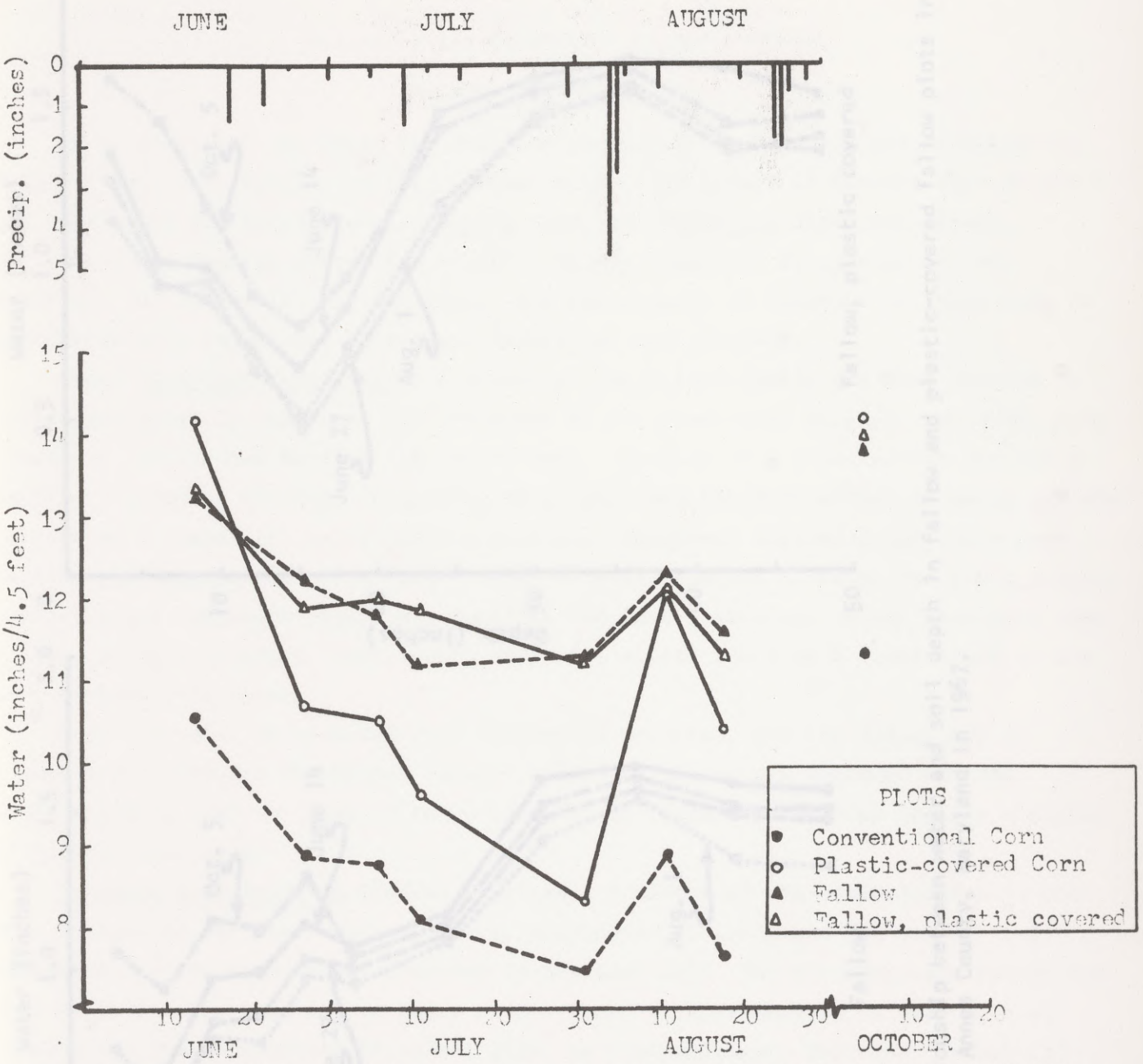
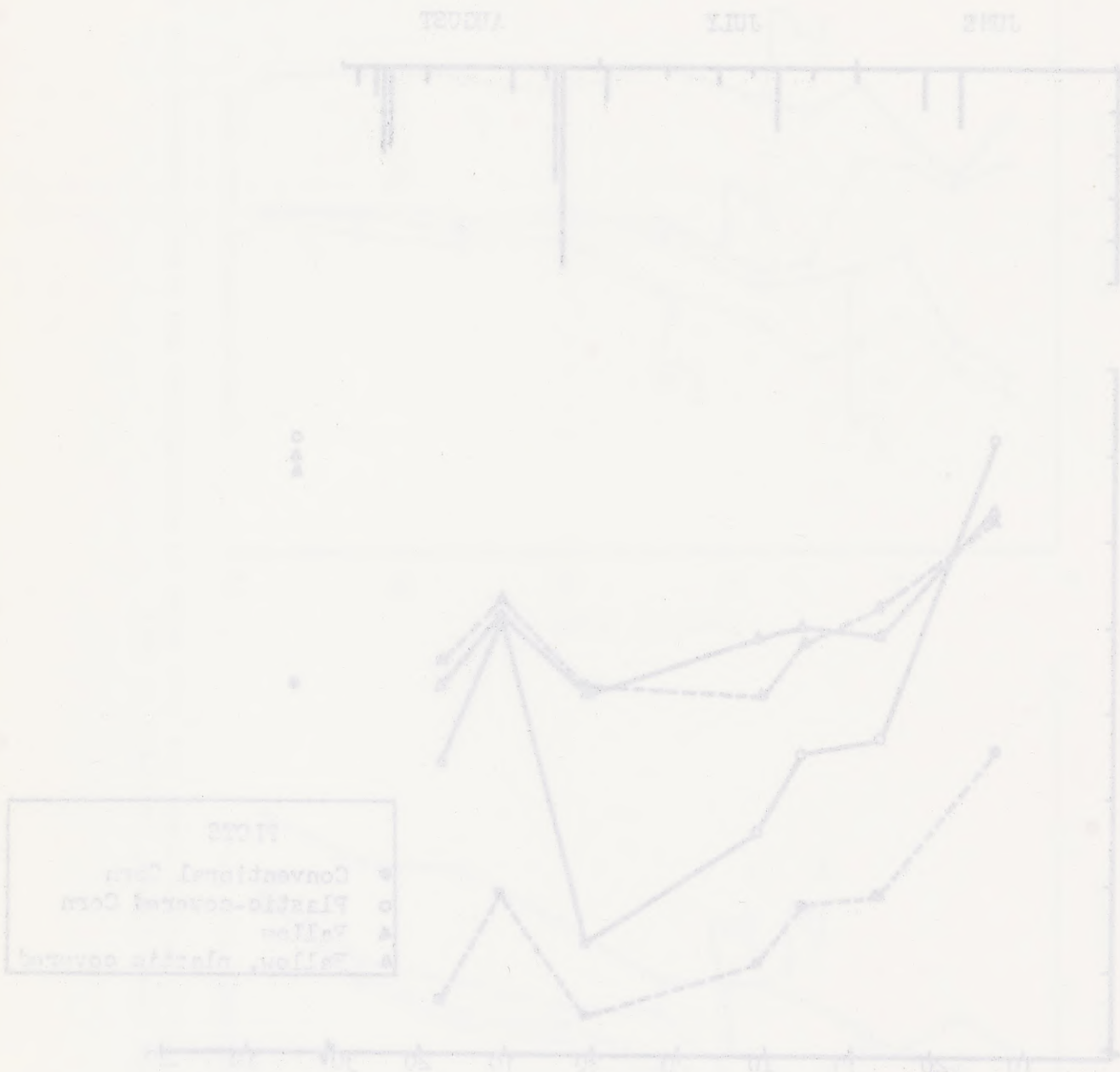


Figure 2 Relationship between total water in soil profile and precipitation at selected sampling times during summer of 1967 in Queen Annes County, Maryland. Plastic was applied on May 31. Values given for total water for the various treatments are averages for duplicate plots.



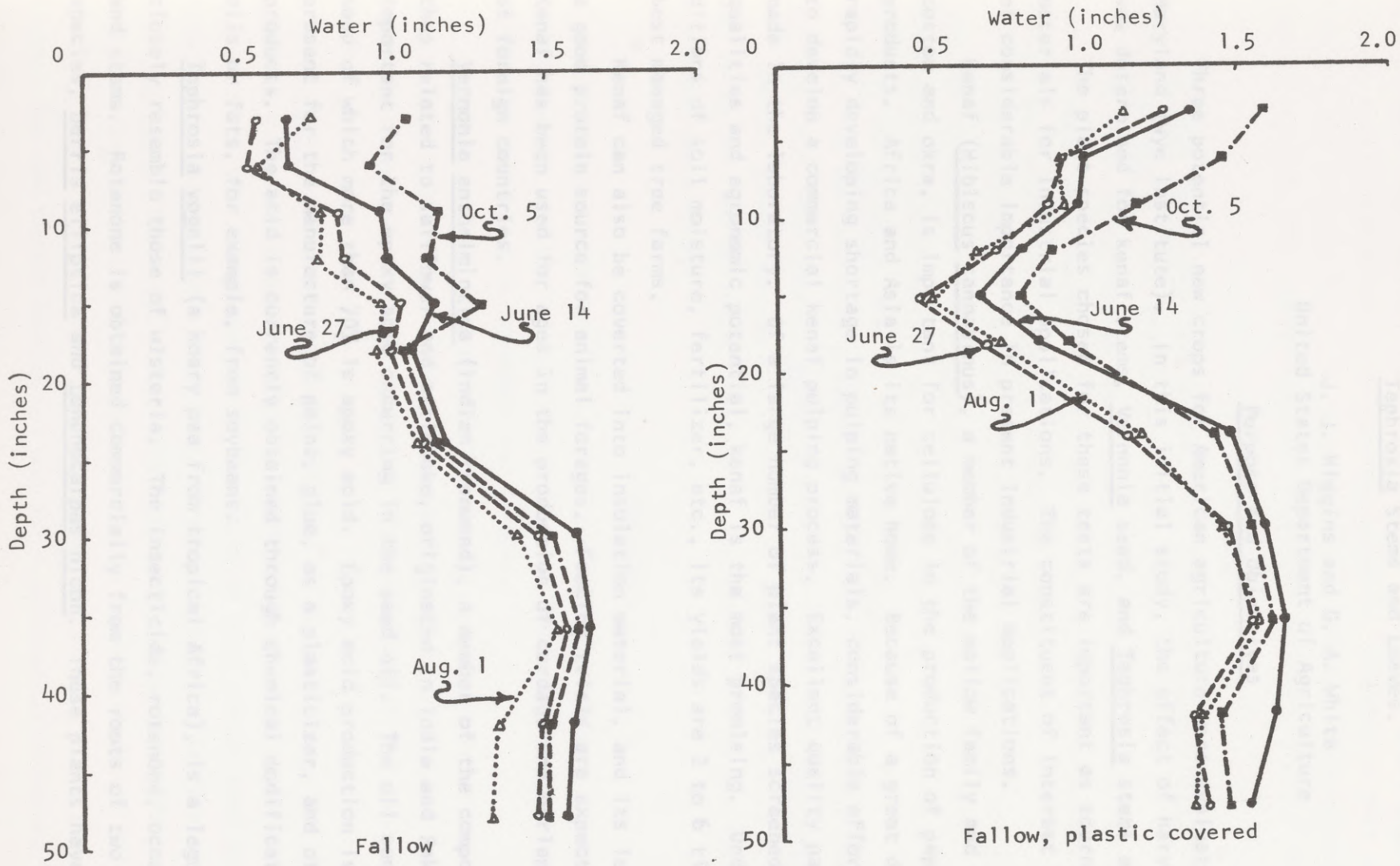


Figure 3 Relationship between water and soil depth in fallow and plastic-covered fallow plots in Queen Annes County, Maryland in 1967.

Effect of Harvest Date on Yields of Potential New Crops at Wye Mills, Maryland: Kenaf Stems, Vernonia Seed, and Tephrosia Stems and Leaves.

J. J. Higgins and G. A. White
United States Department of Agriculture

Purpose and Objectives

Three potential new crops for American agriculture were evaluated at Wye Mills, Maryland (Wye Institute). In this initial study, the effect of harvest date on yield was determined for kenaf stems, Vernonia seed, and Tephrosia stems and leaves.

The plant species chosen for these tests are important as sources of raw materials for industrial applications. The constituent of interest for each crop is of considerable importance in present industrial applications.

Kenaf (Hibiscus cannabinus), a member of the mallow family and thus related to cotton and okra, is important for cellulose in the production of paper and other pulp products. Africa and Asia is its native home. Because of a great demand for and a rapidly developing shortage in pulping materials, considerable effort is being expended to develop a commercial kenaf pulping process. Excellent quality papers have been made in the laboratory. Of a large number of plant species screened for their pulping qualities and agronomic potential, kenaf is the most promising. Under favorable conditions of soil moisture, fertilizer, etc., its yields are 2 to 6 times those of the best managed tree farms.

Kenaf can also be coverted into insulation material, and its leaves may be a good protein source for animal forages. Feeding trials are expected in 1968. Kenaf has been used for ages in the production of cordage and burlap bags in a number of foreign countries.

Vernonia anthelmintica (Indian Ironweed), a member of the composite family and thus related to safflower and artichoke, originated in India and Pakistan. It is important for the epoxy acid occurring in the seed oil. The oil comprises 25% of the seed of which more than 70% is epoxy acid. Epoxy acid production is very high at present for the manufacture of paint, glue, as a plasticizer, and other industrial products. The acid is currently obtained through chemical modification of other oils or fats, for example, from soybeans.

Tephrosia vogelii (a hoary pea from tropical Africa), is a legume whose flowers closely resemble those of wisteria. The insecticide, rotenone, occurs in the leaves and stems. Rotenone is obtained commercially from the roots of two tropical plant species, Derris elliptica and Lonchocarpus nicon. These plants have a liana type

growth and the roots are harvested from the wild since cultivation is difficult and considerable labor is required for harvesting. Domestic grown Tephrosia would thus provide a more stable source of rotenone which is included in many commercial insecticidal formulations. The natural insecticide has a low toxicity to warm-blooded animals, and insects have not developed resistant strains to the insecticide.

Procedure

Hibiscus cannabinus (Everglades #71), Vernonia anthelmintica (P.I. 283729), and Tephrosia vogelii (P.I. 257533) were planted May 17, 1967.

The experimental design was a randomized block with 4 replications. The three harvest dates were September 7, 27, and October 25, with the exception that the first harvest was omitted for Vernonia because of immaturity.

Plots consisted of 10 rows, 20 inches apart for Hibiscus and Vernonia, and 7 rows, 30 inches apart for Tephrosia. All plots were 40 feet long. In each plot, 1/810 acre or 1/2000 hectare was harvested from the 2 center rows 16' 2" long for Hibiscus and Vernonia, and 10' 9" long for Tephrosia.

Seeding was done with a Planet Jr. with the following plate settings and rates: Hibiscus (#23, 19.8 lbs/A); Vernonia (#16, 3.8 lbs/A), and Tephrosia (#18, 10.9 lbs/A).

NPK was plowed down at 80, 17.6, and 33 lbs/A and disked in just prior to planting at 50, 44, and 83 lbs/A. Treflan at the rate of 1/2 to 3/4 lbs/A was applied as a pre-emergence spray.

Results

All harvests were completed before any significant frost damage to plants. No irrigation was applied. Rainfall was adequate through August, while a soil moisture deficiency developed in September and October.

Kenaf dry-weight stem yields increased to 5.4 tons/acre with later harvests (Table 1). Fresh weight of stems increased to 25 tons/acre with later harvest date, while fresh weight of leaves decreased from a maximum of 6.8 tons/acre with later harvest date.

Vernonia seed yields were not affected by harvest date. The 750 to 800 pounds per acre yields were approximately one-half of those that might be expected. This reduction in yield is explained on the basis of very uneven seed germination which resulted in plants with a wide range of seed maturity at harvest time.

Tephrosia dry-weight stem yields reached a maximum of 2,580 pounds/acre with the last harvest date although this value was not significantly different from the yield in the second harvest (Table 3). Leaf dry weight, 1,700 pounds/acre, was highest for the second harvest but was not significantly different from the last harvest.

This reduction in leaf yield for a late season harvest at Wye was also observed in studies at Glenn Dale, Maryland.

Summary

Yields of three potential new industrial crops were evaluated at Wye Mills, Maryland for three different harvest dates.

Kenaf, a very promising source of paper pulp and other pulp products, yielded 5.4 tons/acre of dry stalks in the last harvest date. In an early September harvest, fresh weight of leaves was 6.8 tons/acre. Kenaf leaves are being considered as a good animal protein source.

Vernonia anthelmintica seeds contains epoxy acid now used in paints, glues, and plastics. Yields of approximately 800 pounds/acre were produced for plants in an early and medium stage of fruit development. Because of an uneven germination of seeds, yields were probably only one-half of what can be expected.

Tephrosia vogelii leaves and stems contain the insecticide, rotenone. The dry weight of stems increased with later harvest date to 2,580 pounds/acre while the maximum dry weight of leaves of 1,700 pounds per acre occurred at the second harvest.

Table 1. Effect of harvest date on growth and yield of Hibiscus cannabinus stems and leaves. Wye Mills, Maryland, 1967.

Harvest date	Plants/Acre (1000)	Height (cm)	STEM Nodes (No.)	STEM WEIGHT Fresh (tons/A)	STEM WEIGHT Dry (tons/A)	STEM WEIGHT Dry (%)	LEAF WEIGHT Fresh (tons/A)
9/7/67	147	235	47.6	20.2	3.22	15.9	6.40
	165	240	47.4	21.5	3.57	16.5	7.22
	145	245	47.5	20.0	3.12	15.6	6.85
	137	252	52.6	20.1	3.44	17.6	6.66
Mean	147 a*	243 c	48.8 c	20.4 b	3.34 c	16.4 c	6.78 a
9/27/67	113	270	63.5	22.8	4.66	20.5	5.31
	120	270	64.8	21.6	4.05	18.6	5.92
	100	278	60.5	21.3	4.01	18.8	5.51
	104	260	60.2	24.4	4.70	19.2	4.21
Mean	108 c	270 b	62.0 b	22.5 b	4.35 b	19.2 b	5.22 b
10/25/67	128	282	72.5	22.6	5.40	23.8	4.70
	126	296	75.5	25.8	5.31	20.6	4.50
	126	290	68.5	24.2	5.31	22.0	3.89
	115	300	77.5	27.4	5.60	20.5	2.47
Mean	123 b	292 a	74.0 a	25.0 a	5.40 a	21.7 a	3.89 c

*Means for any given variable followed by any letters in common are not significantly different at the 5% level according to Duncan's Multiple Range test.

Table 2. Effect of harvest date on growth and seed yield of Vernonia anthelmintica. Wye Mills, Maryland, 1967.*

Harvest date	Plants/Acre (1000)	Height (cm)	Fruit stage	Seed yield (lbs/A)
9/27/67	114	160	1.2	928
	79	155	1.1	838
	122	175	0.6	671
	137	175	0.7	796
Mean	113	166	0.9	808
10/25/67	114	175	2.6	812
	74	175	2.2	764
	106	175	2.2	758
	118	180	2.0	692
Mean	102	176	2.2	756

*Fruit stage significantly different at the 1% level. No other variable significantly different.

Table 3. Effect of harvest date on growth and yield of Tephrosia vogelii stems and leaves. Wye Mills, Maryland, 1967.

Harvest Date	Plants/ acre	Height (cm)	STEM Nodes (No.)	STEM WEIGHT Fresh (lbs/A)	STEM WEIGHT Dry (lbs/A)	STEM WEIGHT Dry (%)	LEAF WEIGHT Fresh (lbs/A)	LEAF WEIGHT Dry (lbs/A)	LEAF WEIGHT Dry (%)
9/7/67	34,000	113	19.6	8,850	1,540	17.5	6,720	1,460	21.8
	32,400	100	18.7	8,100	1,380	17.4	6,160	1,380	22.2
	32,400	108	19.1	9,000	1,540	16.7	6,800	1,540	22.2
	30,800	108	19.3	7,780	1,300	16.5	6,160	1,300	21.4
Mean	32,400 b*	107 b	19.2 c	8,680 b	1,460 b	16.9 c	6,480 b	1,460 b	21.8 b
9/27/67	38,900	135	24.0	11,420	2,350	20.2	7,380	1,620	22.6
	38,100	115	23.3	12,250	2,590	21.3	7,450	1,860	25.4
	36,500	125	23.4	12,000	2,350	19.4	7,700	1,620	21.6
	34,800	130	24.8	12,250	2,510	20.4	8,180	1,780	22.0
Mean	37,000 a	126 b	23.8 b	11,900 a	2,430 a	20.3 b	7,700 a	1,700 a	22.8 a
10/25/67	29,200	118	24.5	10,150	2,430	24.2	5,600	1,300	23.4
	30,800	138	25.2	12,300	2,910	23.7	6,560	1,540	24.6
	34,000	145	26.2	11,850	2,910	25.0	5,760	1,620	24.6
	34,000	140	27.3	9,340	2,180	23.1	6,720	1,700	24.9
Mean	32,100 b	135 a	25.8 a	10,870 a	2,580 a	24.0 a	6,160 b	1,540 a	24.4 a

*Means for any given variable followed by any letters in common are not significantly different at the 5% level according to Duncan's Multiple Range test.

The Response of Corn to Subsoiling and Deep Plowing

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Purpose and Objectives

There is a great deal of interest in Maryland about subsoiling and deep plowing. This is evidenced by observation of the many hundreds of acres subjected to this treatment each year and the fact that many questions are asked about these subjects at winter meetings and through correspondence. There has been no recent experimental work done in Maryland on the effects of subsoiling. Experience from other states indicates that, in most cases, subsoiling does not increase yields substantially enough to warrent the operation. Where it has been beneficial, it is usually short lived. Yet, farmers continue to practice this operation; maintaining that it facilitates better drainage and aeration in certain soils and breaks up plow pans and hard pans in other soils. Deep plowing is also practiced in some cases to accomplish these same ends.

The availability of the land at the Wye Institute offered the possibility of looking into this practice from the standpoint of an experimental design. The objective was to practice subsoiling at different spacings in both the fall and spring. Deep plowing was investigated only from the standpoint of a spring operation. It was hoped that a chisel plow might be incorporated into the design, but this was not realized at the time the operations were begun.

Procedure

The soils on the test site were the Bertie silt loam (somewhat poorly-drained) and the Mattapex silt loam (moderately well-drained). Observation indicated that these soils on the test site possessed a moderate to weakly developed plow pan or traffic pan. Corn was chosen as the test crop.

A total of 72 plots were laid out, each measuring 20 x 50 feet. The treatments were to be tested on both a yearly basis and alternate year basis for both fall and spring operations. Three subsoil spacings were incorporated into the design at 22, 44, and 80 inches apart. The depth of subsoiling was constant (23") over the entire experiment. Four replications were chosen for the experiment, each with a check plot plowed to a depth of 8 inches. Thus, eight reps would be available for the first year since the alternate year design would incorporate a "double experiment" the first year. Deep plowing was accomplished at a depth of 12 inches.

A yield goal of 125 bu./ac. was established and fertilizer was applied according to soil test recommendations. A total of 400 pounds of 0-20-20 was plowed down, and 400 pounds of 5-10-10 was applied in the planter. It was planned that 120 pounds of

nitrogen was to be side dressed, but after the side dressing operation, it was found that only 75 pounds had been applied. Atrazine, at the rate of 2 pounds per acre, was used. The corn variety XL-45 was planted in 30 inch rows on May 3. Two cultivations were made.

Results

Table 1 contains the results of the 1967 season's data.

From the data, it can be seen that there is essentially no difference in any of the treatments. The variation among the average figures is attributed to random variation attendant to any experiment of this nature. These data are not unlike those reported from other areas outside Maryland.

Data from Coastal Plain soils in the Carolinas have indicated encouraging results only when deep placement of lime and fertilizer are included with the subsoiling treatment. The nature of Maryland's soils is such that the chemical environment of the subsoil is not conducive to optimum plant growth. Very acid conditions are the rule in most of Maryland's subsoils.

There are only two soil situations which, in the author's opinion, might respond to subsoiling in Maryland. One is that situation where there is a thin root restricting layer beneath the plow layer which can be broken through entirely by a subsoiler. The other situation is that which might result in better drainage and aeration if the subsoiling is accomplished either at the appropriate grade or in soil materials conducive to long-lived structural displacement. Neither of these two situations exist extensively in the State.

Summary

On the basis of only one year's data, it appears that subsoiling and deep plowing are of no benefit on the soils utilized for this experiment. There may be soils in Maryland that might respond to these treatments. But careful observations should be made to verify this fact because Maryland farmers are spending a great deal of time and money performing an operation that has questionable merit.

Table 1. Average corn yields from 8 replications of the subsoiling and deep plowing experiments - Wye Institute, 1967.

Treatment	Yield bu./A @ 15.5% moisture
A. Check - plowed 8" deep	112
B. Subsoiling 23" deep	
1. Fall - spacing	
a. 22"	115
b. 44"	113
c. 80"	108
2. Spring - spacing	
a. 22"	112
b. 44"	115
c. 80"	115
C. Deep plowing - 12" deep	
1. Eight reps. - spring, every year	114
2. Eight reps. - spring, alternate years	111

Herbicide Evaluation on Corn and Soybeans at the Wye Institute, 1967

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Purpose and Objectives

The performance of chemicals for weed control must be evaluated at different locations under varying climatic and soil conditions for valid herbicide recommendations. To this end, the Wye Institute afforded an excellent location. Our objective was to test a number of coded and registered herbicides for weed control in corn and soybeans.

One experiment with narrow row soybeans was conducted in cooperation with B. E. Caldwell and J. A. Schillinger. Three experiments were conducted on corn.

Procedure

Soybeans: Kent variety was planted June 7 with 8 treatments replicated four times (refer to Table 1 for treatments). Vernolate, 3 lb/A preplant-incorporated, was applied June 7 on the plots receiving a herbicide. Treatments 4, 5, 6 were cultivated June 27; treatment 4 and 6, July 6; and treatment 6, July 20. Treatments 1, 2, and 8 received no cultivation.

Corn: Three experiments were conducted with corn. Corn was planted on May 17 and all preemergence plots were treated on May 27. All plots were cultivated on July 10. Unfortunately, cutworms invaded these plots and seriously reduced the plant population.

A number of herbicide combinations were tested. These are listed on Table 2. Nutsedge overtook this plot and the experiment was converted to a split plot; one half of each replication was sprayed with 4 lb/A atrazine plus 2 gal/A Sun soil 11E on June 27.

The second corn experiment included coded and registered herbicides. These treatments were triplicated and are listed in Table 3. Postemergence application was made on June 6.

The third corn experiment was a study of the effect of atrazine on the stage of growth of corn. All plots received 2 lb/A atrazine preemergence on May 27. Postemergence applications were made at various dates with 2 lb/A of atrazine with and without 2 gal/A Sun oil 11E. Refer to Table 4 for treatments and postemergence treatment dates.

Results

Weed control in the 30-inch row soybeans which received herbicide and no cultivation (treatment 2) was excellent for grassy weeds 2 months after herbicide application (77.5% control), but the initial broadleafed weed control (81.3% control) dissipated in 5 weeks. The grass consisted primarily of giant foxtail (*Setaria faberii*), and the broadleafed weed population was mostly Jimson weed (*Datura stromonia*). Jimson weed

germinated continuously this past summer because of the frequent rains. One cultivation plus the herbicide (treatment 3) increased broadleafed weed control to 80%. Cultivation alone was effective on the broadleafed weeds but only partially successful on the grassy weed.

Weed control in the 7-inch rows with herbicide (treatment 8) was excellent due not only to the herbicide but also the shading of the foliage. Weeds were abundant in the 7 inch rows which received neither cultivation nor chemical treatment.

Duncan's multiple range was used to test significance of yields (Table 1). Highest yields were recorded on the 7-inch row receiving only herbicide for weed control. Lowest yields occurred on the 30-inch rows with no cultivation or herbicide. Treatments 2, 3, 4, 5, 6, and 7 were not significantly different. Although the soybeans were injured early in the season by the herbicide the yields were not effected.

The yields from the corn-herbicide combination experiment (Table 2) were not significant from the control. Atrazine at 4 lb/A plus Sun oil 11E resulted in over 99% nutsedge control, but there was no increase in yields over the control. There are several factors responsible for this: (1) the decreased plant population due to the cutworm, (2) the toxic effect of nutsedge tuber on plant growth and (3) the ideal growing conditions for corn may have overcome some of the competitive effects of the nutsedge.

The yields on the pre- and post-emergence herbicide experiment were also not significant from the control. However, weed control ratings were possible because the nutsedge population was not excessive. Ratings from 0 to 10 can be converted to percent control by moving the decimal to the right one place. A rating of 7 or higher is commercially acceptable weed control. Good to excellent broadleafed weed control was observed 2 months after treatment except for 1 lb/A dicamba and 1 lb/A atrazine postemergence. Broadleafed weed control was excellent with all herbicides except dicamba. Good to excellent nutsedge control was noted with atrazine postemergence and CP50144 4 lb/A preemergence.

In the third corn experiment, all plots were first treated with 2 lb/A atrazine preemergence, and the effect of 2 lb/A atrazine postemergence with and without Sun oil 11E was observed. Significant reductions in yields were noted on corn sprayed at lay-by time. The significant yield reduction on the June 7 spraying date without oil cannot be explained.

Summary

Highest soybean yields were harvested from 7 inch rows receiving vernolate at 3 lb/A for weed control. One cultivation plus the herbicide increased jimson weed control to 80%. Cultivation alone was effective on the broadleafed weeds but

ineffective on the grassy weeds.

Atrazine at 4 lb/A plus 2 gal/A Sun oil 11E resulted in over 99% control of nutsedge; 2 lb/A plus 2 gal/A Sun oil 11E resulted in 88% control.

Atrazine applied at lay-by time appears to lower corn yields.

Table 1. Soybeans (Narrow Row) - Wye Institute:

Yield and rating[1] summary of herbicide performance, 1967

Treatment	RATING DATA									YIELD[2]
	Grass Weeds			Broadleafed Weeds			Soybeans			
	June 28	July 18	July 30	June 28	July 18	July 30	June 28	July 18	July 30	Bu/A
1. control	0	0	0	0	45.00	2.5	0	0	0	8.4a
2. 30" no cult. + herbicide	88.8	80.0	77.5	81.3	45.0	60.0	12.5	18.8	17.5	25.7bc
3. 30" 1 cult. + herbicide	91.5	75.0	85.0	82.5	75.0	80.0	17.5	26.3	10.0	27.8bc
4. 30" 2 cult. + no herbicide	0	67.5	62.5	0	87.5	82.5	0	0	0	25.9bc
5. 30" 1 cult. + no herbicide	0	27.5	40.0	0	55.0	70.0	0	0	5	20.0bc
6. 30" 3 cult. + no herbicide	0	62.5	61.5	0	70.0	92.5	0	0	0	27.9bc
7. 7" drill no herbicide	0	12.5	0	0	50.0	32.5	0	0	0	17.0ab
8. 7" drill herbicide	91.5	97.5	92.5	86.3	82.5	75.0	11.3	21.3	7.5	30.0c

[1] Rating Scale
100.0 = complete kill, 0 = no kill

[2] Number having the same letter are not significant

Table 2. Herbicide combination test for weed control in corn

	Treatment	lb/A	Bu/A	
			No atrazine postemergence	Atrazine postemergence
1.	control	-	106.5	111.3
2.	atrazine + ramrod	1 3	104.1	102.8
3.	atrazine + simazine	1 1	94.6	90.2
4.	atrazine + prometryne	1 1	91.5	105.3
5.	atrazine + linuron	0.6 0.6	100.7	96.2
6.	Ramrod + linuron	1.6 0.6	93.3	91.0
7.	C-6898 + Patoran	2 1	109.2	94.0
8.	C-6898	2	100.1	108.4
9.	Patoran	2	101.7	90.7
10.	atrazine	2	108.3	108.8
11.	Prometryne	2	91.8	81.2
12.	Simazine	2	88.3	100.1
13.	Ramrod	3.2	106.0	97.4
14.	linuron	1	114.5	104.5

Table 3. Pre- and Post-emergence herbicides for weed control in corn.

	Treatment	lb/A	Application	RATING DATA[1] Nutsedge	Grass Weeds	Broadleafed Weeds	Corn	YIELD Bu/A
1.	Control	-	-	2.5	3	3.3	0.3	115.4
2.	dicamba	1	preemergence	5.7	6.3	9.5	1.7	129.6
3.	dicamba	1	postemergence	1.0	3.3	2.5	0.3	153.2
4.	CP50144	2	preemergence	4.7	9.7	7.0	3.0	120.3
5.	CP50144	4	preemergence	7.2	9.7	9.2	0	152.6
6.	C-6313(W-50)	1.5	preemergence	5.7	9.3	7.0	2.0	134.9
7.	C-6313(W-50)	3	preemergence	3.7	7.3	5.3	1.0	135.1
8.	C-6313(W-75)	1.5	preemergence	4.2	9.3	8.5	0	144.9
9.	C-6313(W-75)	3	preemergence	4	9.7	6.7	1.7	140.0
10.	SD15418	1	preemergence	2	7.5	8.7	3.7	123.9
11.	atrazine	1	postemergence	8.3	10.0	3.3	2.3	141.1
12.	atrazine + oil	1 + 2 gpa	postemergence	6.3	9.8	9.7	0.3	140.0
13.	atrazine	2	postemergence	7.3	9.8	6.7	.3	135.7
14.	atrazine + oil	2 + 2 gpa	postemergence	8.8	10.0	9.7	1.3	139.5

[1] 0 = no kill
10 = 100% kill

Table 4. Atrazine experiment for weed control in corn (1967)

	Treatment	2 gal/A oil	Date treated post emergence	Bu/A
1.	control	-	-	147.6
2.	atrazine	-	June 7	133.6**
3.	atrazine	+	June 7	147.0
4.	atrazine	-	June 28	152.9
5.	atrazine	+	June 28	143.5
6.	atrazine	-	July 5	125.0**
7.	atrazine	+	July 5	131.0**

**highly significant

Comparative Performance of Cereal Crop Varieties

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Purpose and Objectives

The objective of this experiment is to find superior hybrids for use at low altitudes in Maryland.

Poor soil drainage, high air humidity and favorable conditions for the development of some diseases and insects may discourage the use of some high-performing hybrids on the Eastern Shore. The more precisely a hybrid can be fitted to a specific, local environment the better agriculture will be served.

Procedure

New and experimental hybrids will be compared with hybrids now being used. Observations will be made at various levels of fertilization, plant population, and other cultural practices that appear to be practical. Special attention will be given to consistent productivity, stalk strength, stalk rot, leaf blight, insect infestation, etc. Due to the wide fluctuation from year to year in the complex of growth factors that affect corn growth at a given test location, one year's test is never conclusive without repetition and much supplimentary information gained elsewhere.

Results

In 1966, a 30-entry, 4-replicate test for corn hybrids was conducted. This test was located in the southwest corner of the "front field" along the lane to the Burris' residence (Range 1). The test followed corn and received 700 lbs. 5-10-10 fertilizer plowed down and 300 lbs. of the same along the row at planting time. Planting was by hand in 40-inch rows at 15,680 seeds per acre. Atrazine sprayed pre-emerge over the row was used for weed control. Planting was done June 2.

The crop started off well but was limited in mid-growth by drought. At harvest there was much stalk breakage due principally to stalk rot. Breakage ranged from 9% to 50% per entry and was associated with plot location. Yields of grain at 15.5% moisture ranged from 56 to 95 bu. with an average of 72 bu. per/A. Variation among replicate plots was high. Taken alone this test does not reliably rate the entries. It does, however, supply data that will supplement other data from other tests.

In 1967, two hand-planted 30-entry, 4 replicate corn tests were conducted on higher land a short distance from the site of the 1966 test. The two 1967 tests

divided the NE end of Field Range 2 into blocks of equal size. The blocks were in soybeans the previous year. Both blocks received uniform applications of fertilizer--500 lbs. per/A 16-8-8 plowed down and 300 lbs. per/A 5-10-10 along the row. Atrazine was applied after planting for weed control. Only 5 hybrids were included in both tests. These hybrids have been widely grown over a period of years. They help to relate one test to another.

In contrast to the previous year the 1967 tests were planted in 30" instead of 40" rows and at 17,424 instead of 15,680 seeds per/A. Planting was done May 17, 1967.

Emergence and early growth of the crop were slow due to an unusually cool May. In some areas of the tests, cut worms depleted the initial stand. Poor stands increased experimental error and in some cases necessitated dropping the entry from yield summaries. After eliminating test entries with obviously poor stands in one or more replications, the number of entries left for statistical comparison were 24 for test no. 1 and 22 for test no. 2.

Summary

Perhaps the most definite point shown by the tests is that this location presents growth conditions that can cause a wide variation in the responses of different hybrids in the same season as well as in consecutive seasons. In spite of the large differences between hybrids required for statistical significance (LSD 24 and 21 bus.), a number of hybrids show significant differences. Stand losses, both random and consistent among replicates, were largely responsible for the wide variation in yield among the entries in both tests. Soil variability was reflected in all tests.

Table 1. Grain-yield comparisons for two adjacent corn tests: Range 2, Wye Institute Farms, 1967

Test no. 1			Test no. 2		
Entry	Grain moisture	Bu/A	Entry	Grain moisture	Bu/A
Asgrow A110B	27.2	126	Agway C723x	25.6	109
" A120	27.8	109	Crib Filler 60	26.0	120
" ATC79	26.8	80	" " 66	25.1	139
" ATC103	27.6	107	" " 88	25.6	117
DeKalb XL385	25.6	138	" " 123	26.8	136
" 805A	24.0	116	Funk 4566	27.8	77
" XL45	22.7	103	" 4333	21.1	85
Funk 4644	27.8	111	Moews SM3	21.7	88
" 4350	22.9	74	" SM6	25.6	125
" 4601	28.0	118	*NE912 (Agway)	27.8	111
*NE912 (Agway)	28.6	92	N. King Px676	26.0	117
N. King Px610	23.4	83	N. King Px674	26.4	112
N. King Px52	23.8	86	Ohio W64 (Agway)	23.8	88
*Pa602A (Agway)	23.8	70	*Pa602A (Agway)	21.8	81
PAG 313	23.8	68	Pa820 (Pa. Sta.)	25.8	95
* " Sx29	28.4	95	*PAG Sx29 (Pa. Sta.)	27.8	117
" Sx99	32.1	106	" Sx9	23.4	87
Pioneer 3304	26.6	114	" Sx93	22.5	92
* " 3306	25.4	110	*Pioneer 3306	26.2	140
S.S. Matoka	26.1	134	" 3567	22.9	96
" 866	26.4	120	*S.S. 820s	26.8	144
" 720	25.6	114	" 860	26.4	104
* " 820s	26.2	134			
Todd 855	25.8	122			
Test av.		105.4			108.2
LSD		24 bu.			21 bu.

* In both tests

Table 1. Grain-yield comparisons for two adjacent corn tests:
Range 2, Wye Institute Farms, 1967

Test no. 1			Test no. 2	
Entry	Grain moisture	Bu/A	Entry	Grain moisture	Bu/A
Asgrow A1108	27.2	126	Agway C723x	25.6	109
" A420	27.8	109	Crib Filler 60	26.0	120
" ATC29	26.8	80	" " 66	25.1	139
" ATC103	27.6	107	" " 88	25.6	117
DeKalb XL38S	25.6	138	" " 123	26.8	136
" 805A	24.0	116	Funk 4566	27.8	77
" XL45	22.7	103	" 4933	21.1	85
Funk W64A	27.8	111	Moews 515	21.7	88
" 4350	22.9	74	" 5M6	25.6	125
" W601	28.0	118	*NE912 (Agway)	27.8	111
*NE912 (Agway)	28.6	92	N. King Px576	26.0	117
N. King Px610	23.4	83	N. King Px674	26.4	112
N. King Px52	23.8	86	Ohio W64 (Agway)	23.8	88
*P3902A (Agway)	23.8	70	*P3902A (Agway)	21.8	81
PAG 313	23.8	68	P3820 (Pa. Sta.)	25.8	95
" Sx29	28.4	95	*PAG Sx29 (Pa. Sta.)	27.8	117
" Sx99	32.1	106	" Sx9	23.4	87
Pioneer 330A	26.6	114	" Sx9a	22.5	92
" 330G	25.4	110	*Pioneer 330G	26.2	140
S.S. Matoka	26.1	134	" 3567	22.9	96
" 866	26.4	120	*S.S. 820s	26.8	144
" 720	25.6	114	" 860	26.4	104
" " 820s	26.2	134			
Todd 855	25.8	122			
Test av.		105.4			108.2
LSD		24 bu.			21 bu.

* In both tests

Improvement of Soybean Production by the Development of New Varieties and the Use of Improved Cultural Techniques

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Purpose and Objectives

New varieties of soybeans are needed that are improved over present varieties in yielding potential, seed quality, fertility response, and disease resistance. More productive varieties are especially needed with Group V maturity and with the potential of high yields when planted late (after small grains). Also more information is needed on the optimum seeding rate of soybeans and the timing of herbicidal treatments.

Objectives for 1967 were:

1) To evaluate new varieties, advanced breeder lines, and standard varieties of soybeans for their agronomic performances.
2) To determine the optimum rate and spacing of soybeans for maximum yield.

Procedure

New varieties, breeder lines and standard varieties were evaluated cooperatively with USDA scientists. On June 1 and 2, soybeans were planted in either $7\frac{1}{2}$ x 20 or $8\frac{1}{2}$ x 20 foot plots containing three or four 30 inch rows. Data recorded on these entries included maturity, height, lodging, yield, seed quality, protein content, oil content and seed size. Yield was measured by harvesting 16 feet of the center 2 rows of the 4 row plot and the center row of the three row plots.

A planting rate x spacing study of soybeans was initiated on June 2 and consisted of the following treatments:

Varieties: Kent - (Maturity Group IV)
Dare - (Maturity Group V)

Spacings: S_1 = 40" Rows
S_2 = 30" Rows
S_3 = 7" Drill Rows

Rates: R_1 = 2.30 plants/sq. ft.
R_2 = 5.90 plants/sq. ft.
R_3 = 7.60 plants/sq. ft.

Four replications of all possible combinations of varieties (spacings x seeding rates) were planted in 9 x 20 foot plots. Data on yield, height, lodging and maturity date were collected.

Results

An exceptionally wet July and August resulted in much vegetative growth of the soybeans. The rapid, lush growth was detrimental to late maturing varieties since they lodged badly at the time of flowering and pod setting, thus reducing their chances of producing top yields.

Results of only one small test of the variety and strain studies are included in this report. Data on the remaining tests are currently being collected and computed.

The agronomic performance for a test containing 14 soybean varieties and advanced breeding lines are presented in Table 1. The data are averages of two replications for each variety. The differences in yields were statistically significant at the 10% level of probability among the varieties. A new strain from Indiana, C1278, produced the highest yield of the varieties tested. The variety C1278 is similar to the Kent variety in height, lodging score, seed quality, and seed size, but matured 5 days earlier. A newly released variety, York, yielded 42.1 bushels per acre and produced large seeds, but lodged badly as did most of the later maturing varieties. Poor seed quality characterized the early maturity varieties, Wayne and Adelphia. Adelphia was the most outstanding variety for lodging resistance.

The three rates of seeding of Dare and Kent soybean varieties, namely 2.3, 5.9 and 7.6 plants per square foot, resulted in significantly different yields. The intermediate rate of 5.9 plants per square foot produced yields significantly higher than the remaining two rates for both varieties, 48.6 for Kent and 44.1 for Dare. Lodging was more severe on the higher planting rates, thus contributing to the lower yields of Dare.

Although the differences in spacings were not significantly different, the highest yields obtained in this experiment were associated with the 7" drill plantings at the intermediate rate of seeding. A yield of 54.0 bushels per acre was obtained with the Kent variety drilled at the 5.9 plants per square foot rate.

A plant growth hormone, Amchem 66-329 from the American Chemical Company, was sprayed on plots of Dare and Kent soybeans on an observational basis. It resulted in shortened plants that did not lodge, whereas unsprayed plots were badly lodged. Also noted with the Kent variety was a greater retention of the beans in the pods in contrast to the pronounced shattering of the pods in the unsprayed plots. Slightly more pods per plant were found on the sprayed plots, 142 vs. 134 pods/plant on sprayed and unsprayed Kent soybeans. More information is needed on this hormone, and especially its effects on pod setting and reduction of seed shattering.

Summary

Soybean varieties and breeder lines were tested in replicated tests. Results of one small test depict the relatively high soybean yields found in the studies at the Wye Institute this year. A high yield of 48.9 bushels per acre was recorded for C 1278, a new strain of soybeans from Indiana. Lodging was common in many varieties, however the Adelphia variety was very erect in all tests.

Three rates of seeding soybeans, 2.3, 5.9 and 7.6 plants per square foot and three row spacings, 40", 30" and 7" rows, were evaluated for two varieties (Kent and Dare). The intermediate rate of seeding produced significantly greater yields than the other two rates. The highest yields (54.0 and 47.8 bushels per acre for Kent and Dare varieties, respectively) were obtained at the intermediate rate of seeding and the 7" row spacing.

Table 1. Agronomic performance of twelve soybean varieties at the Wye Institute, 1967.

Variety	Maturity Group	Yield 1/ Bu/A	Height (in.)	2/ Maturity	3/ Lodging	Seed 4/ Quality	Seed 5/ Size
Wayne	III	47.5 a	42	20	2.8	3.0	20.4
Adelphia		46.0 a	44	22	1.7	3.0	21.4
C 1278	IV	48.9 a	41	30	2.7	2.0	21.2
Clark 63		47.8 a	50	30	3.4	2.0	17.9
Kent		46.1 a	44	35	2.4	2.0	20.6
Scott		45.1 a	53	45	3.4	2.0	16.8
C 1311		42.8 a	55	47	4.1	2.0	16.8
Custer		39.6 b	47	37	2.8	2.0	17.4
Delmar		38.0 b	52	44	2.5	2.0	18.8
Hill	V	42.7 a	39	50	3.8	2.0	15.8
York		42.1 a	41	61	3.2	2.0	22.4
Dare		39.5 b	40	57	3.8	2.0	17.4
Hood	VI	42.0 a	42	61	3.4	2.0	16.5
Lee		35.2 b	40	61	3.1	2.0	18.2

1/ Means followed by same letter are not significantly different at 10% level.
2/ Maturity scores = days after August 31 until 95% of pods were ripe.
3/ Lodging scores rated on 1 to 5 scale, with 1 being plants erect and 5 all plants severely lodged.
4/ Seed quality rated on 1 to 5 scale, with 1 as best quality. (Rating include development of seed, wrinkling, cracking of seed coat, etc.)
5/ Grams per 100 seeds.

Table 2. Yield of Kent and Dare soybeans under various spacings and seeding rates.

KENT

	Rates (Plants/Sq. Ft.) 2.30	5.90	7.60	Mean
Spacings: 40"	40.8	43.9	41.5	42.1
30"	44.5	47.9	42.9	45.1
7"	41.1	54.0	43.0	46.0
Mean	42.1	48.6	42.5	

DARE

	Rates (Plants/Sq. Ft.) 2.30	5.90	7.60	Mean
Spacings: 40"	35.5	42.8	34.5	37.6
30"	40.0	41.7	32.5	38.0
7"	44.6	47.8	40.7	44.4
Mean	40.0	44.1	35.9	

Mean Yields over Both Varieties

Spacings	Bu/A
40"	39.7
30"	41.6
7"	45.2

Rates	Bu/A
2.30 plants/sq. ft.	41.1
5.90 " " "	46.3
7.60 " " "	39.2

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Table 2. Yield of Kent and Dare soybeans under various spacings and seeding rates.

	KENT Rates (plants/sq. ft.)					DARE Rates (plants/sq. ft.)			
	2.30	5.90	7.60	Mean		2.30	5.90	7.60	Mean
Spacings: 40"	40.8	43.9	41.5	42.1	Spacings: 40"	35.5	42.8	34.5	37.6
30"	44.5	47.9	42.9	45.1	30"	40.0	41.7	32.5	38.0
7"	41.1	54.0	43.0	46.0	7"	44.6	47.8	40.7	44.4
Mean	42.1	48.6	42.5		Mean	40.0	44.1	35.9	

Mean Yields over Both Varieties

Spacings	Bu/A	Rates	Bu/A
40"	39.7	2.30 plants/sq. ft.	41.1
30"	41.6	5.90 " " "	46.3
7"	45.2	7.60 " " "	39.2

Field Screening of Cantaloupes for Resistance to Leaf Blight (Alternaria cucumerina)

F. F. Angell
Department of Horticulture

Purpose and Objective

Leaf blight incited by Alternaria cucumerina (Ell. and Ev.) J. A. Elliott is a serious disease of cantaloupes in Maryland. The disease is present each year, but it is more severe during wet, humid seasons. The symptoms first appear as small brown spots which enlarge to form circular necrotic areas. The leaves curl, dry up and drop from the plants. The defoliation results in reduced fruit quality and production.

A fungicidal spray program involving weekly and sometimes biweekly applications from the time the vines begin to run is fairly effective in controlling the disease. Some varieties are resistant, but most of them are not adapted to Maryland. Resistance to leaf blight has been shown to be governed by two allelic pairs of incompletely dominant genes. However, the variety used as the source of resistance in that study is not resistant in Maryland.

This experiment was set up to determine if a field test (natural infection) could effectively be used to screen cantaloupes for resistance to leaf blight. The field test would be used in conjunction with greenhouse tests to screen for resistance and for inheritance studies.

Procedure

The experiment was conducted on the University of Maryland plots at Chester-on-Wye. The soil is a silt loam. The fertilizer application was 400 lb/A 10-10-10 broadcast and disked in two weeks prior to planting.

A 50 ft. row of each of 18 cantaloupe varieties was planted with a cone

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seeder on May 31. The rows were 60 inches apart, and the plants in the row were thinned to 30 inches after the vines had begun to run. The recommended spray program for insect control was followed until flowering occurred. Fungicidal sprays for disease control were not made.

Disease readings were made on August 29 and September 27. Each plot was rated according to the following scale: 1 (susceptible), 2 (moderately susceptible), 3 (slightly resistant), 4 (moderately resistant), 5 (immune or highly resistant).

Results

The 1967 growing season was favorable for cantaloupe production and for the development of leaf blight. There was very little powdery or downy mildew infection.

The disease ratings are given in Table 1. Golden Perfection and Delta Gold were the only varieties rated as resistant. Both were also resistant in tests at other experiment stations. Hearts of Gold was resistant in Kansas but was susceptible in this test.

The distinct separation between susceptible and resistant varieties in this test indicated that a field test could be used to screen for resistance. However, further testing under different environmental conditions should be done to determine the reliability of the test.

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Table 1. Leaf blight disease ratings of cantaloupe varieties.

Variety	Rating [a]	
	Aug. 29	Sept. 27
Edisto 47	2.0	1.0
Md. 63-53	2.0	1.0
Honey Rock	2.0	1.0
Early May	3.0	1.0
Schoons Hardshell	2.0	1.0
Harvest Queen	2.0	1.0
Hearts of Gold	2.0	1.0
Gulfstream	2.0	1.0
PMR 45	2.0	1.0
MS-1	2.0	1.0
Iroquois	3.0	1.0
Queen of Colorado	2.0	1.0
Spartan Rock	2.0	1.0
Delicious 51	2.0	1.0
Md. 67-41	2.0	1.0
Seminole	3.0	1.0
Golden Perfection	5.0	5.0
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[a]Scale 1 (susceptible) to 5 (resistant).

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Observation Trial: Fresh Market Tomato Varieties

F. F. Angell and H. A. Hunter
Department of Horticulture

Purpose and Objectives

Fresh market growers and home gardeners each year request recommendations of tomato varieties and information about established and new varieties. Therefore, an observation trial was set up to determine the performance and plant and fruit characteristics of fresh market varieties.

Procedure

The trial was conducted on the University of Maryland research plots at Chester-on-Wye. The soil is a silt loam. A 5-10-15 fertilizer at the rate of 1000 lb/A was broadcast and disked in two weeks prior to planting. A sidedress application of 120 lb/A ammonium nitrate was made on June 20.

Fifteen plants of each of 22 varieties were grown in 3-inch peat pots in the greenhouse and transplanted to the field on May 31. The plants were spaced 24 inches apart in 60-inch rows. A spray program for insect control was followed, but no effort was made to control diseases.

Plant and fruit characteristics were recorded on description sheets on July 13, July 31, and August 21.

Seed Source

1. Asgrow Seed Company
2. F. W. Bolgiano and Company
3. W. Atlee Burpee Company
4. Campbell Soup Company
5. Otis S. Twilley, Salisbury, Md.
6. Department of Horticulture
   University of Delaware
7. New York State Agricultural
   Exper. Station, Geneva, N. Y.
8. Department of Horticulture
   University of Maryland
9. Desert Seed Company, El Centro,
   California
10. USDA, Beltsville, Maryland

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P. P. Angell and B. A. Hunter
Department of Horticulture

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Results

The descriptions of the varieties are as follows:

Selected Rutgers (5)	Mainseason; indeterminate large vine, good foliage cover; fruit - globe-flat, 4-5 oz., good color, slight cracking and catfacing, medium firmness, u^{+a}, good set. Tolerant to Fusarium. Fruit smaller but better quality than Rutgers. Good production.
Rutgers (1)	Mainseason-late; indeterminate large vine, good foliage cover; fruit - globe-flat, 4-6 oz., good color, moderate cracking, medium firmness, u^{+}, poor set, good flavor. Tolerant to Fusarium. Low production, too much cracking.
Homestead 61 (5)	Mainseason; determinate medium vine, very good foliage cover; fruit - globe-flat, 3-4 oz., fair color, slight cracking, medium firmness, u^{+}, fair set. Resistant to Fusarium. Fruit small, fair quality and production.
Homestead 24 (5)	Mainseason; determinate medium vine, fair foliage cover; fruit - flat, 4-6 oz., good color, no cracking, medium firmness, u^{+}, fair set. Resistant to Fusarium. Good quality fruit, fair production.
Manalucie (5)	Mainseason; indeterminate large vine, good foliage cover; fruit - globe-flat, 4-7 oz., good color, smooth, no cracking, firm, u^{+}, fair set. Resistant to Fusarium and gray leaf spot. Very good fruit quality, fair production.
Manapal (5)	Mainseason; indeterminate medium vine, good foliage cover; fruit - globe-flat, 3-4 oz., good color, moderate cracking, medium firmness, u^{+}, fair set, good flavor. Resistant to Fusarium and gray leaf spot. Fruit small, fair quality, fair production.
Floradel (5)]	Early-mainseason; indeterminate medium vine, good foliage cover; fruit - globe-flat, 4-7 oz., good color, no cracking, smooth, firm, u^{+}, good set, mild flavor. Resistant to Fusarium and gray leaf spot. Very good fruit quality, good production.
Glamour (5)	Early, determinate small open vine; fruit - flat, 4-6 oz., good color, no cracking, firm, u^{b}, good set. Good fruit quality, productive. Looked good for early production.

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a u^{+} - green shoulder

b u - uniform ripening

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The descriptions of the varieties are as follows:

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a u^{+} - green shoulder

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Marion (5)	Mainseason, indeterminate large vine, good foliage cover; fruit - flat, 4-7 oz., fair color, slight cracking, medium firmness, u^+, fair set, good flavor. Resistant to Fusarium. Good fruit size, fair quality, fair production.
Young (8)	Mainseason-late; indeterminate medium vine, good foliage cover; fruit - flat, 4-5 oz., fair color, slight cracking, medium firmness, u^+, fair set, tart flavor. Resistant to Fusarium. Fair fruit quality and production.
Supermarket (1)	Mainseason; determinate medium vine, fair foliage cover; fruit - globe-flat, 4-5 oz., crown fruit, 3-4 oz., limb fruit, no cracking, slight catfacing, slight ridging, firm, u, fair set. Resistant to Fusarium and gray leaf spot. Fair fruit quality and production.
Valiant (5)	Early; indeterminate medium vine, good foliage cover; fruit - flat, 4-5 oz., fair color, moderate cracking and catfacing, medium firmness, u^+, fair set. Susceptible to Fusarium. Poor fruit quality, fair production.
Chesapeake (8)	Late; indeterminate large vine, good foliage cover; fruit - globe-flat, 5-7 oz., good color, no cracking, firm, u, fair set, good flavor. Resistant to Fusarium. Good fruit size and quality, fair production.
Delsher (6)	Late; indeterminate large vine, good foliage cover; fruit - flat, 4-6 oz., good color, slight cracking, medium firmness, u, fair set, good flavor. Resistant to Fusarium. Good fruit size, fair quality and production.
New Yorker (7)	Extra early; determinate very small open vine; fruit - globe-flat, 3 oz., fair color, moderate sunburn, moderate cracking, firm, u, poor set. Susceptible to Fusarium, resistant to Verticillium. Small fruit, fair quality, unproductive.
Early Boy Hybrid (2)	Early; determinate small open vine; fruit - globe-flat, 5-7 oz., fair color, slight sunburn, moderate cracking, medium firmness, u^+, very good set, tart flavor. Good fruit size, very productive, poor quality.
Spring Giant Hybrid (9)	Early, determinate small open vine; fruit - globe-flat, 4-6 oz., fair color, slight sunburn, severe cracking (concentric), medium firmness, u, very good set. Resistant to Fusarium and Verticillium. Good fruit size, very productive, poor quality, mild flavor.
Fantastic Hybrid (5)	Early; indeterminate large vine, good foliage cover; fruit - flat, 4-7 oz., good color, moderate cracking, medium firmness, u^+, fair set. Good fruit size, fair quality and production, very mild flavor (mealy).

Big Boy Hybrid (3)	Mainseason; indeterminate large vine, good foliage cover; fruit - globe-flat, 4-7 oz., good color, moderate cracking, medium firmness, u^+, poor set. Susceptible to Fusarium. Good fruit size, fair quality, unproductive.
Campbell 17 (4)	Early-mainseason; determinate medium vine, good foliage cover; fruit - globe, 4-6 oz., good color, no cracking, firm, smooth, u, good set, good flavor. Resistant to Fusarium. Good fruit size and production very good quality. Looks good for both fresh market and processing.
Campbell 146 (4)	Mainseason; semi-determinate large vine, good foliage cover; fruit - globe-flat, 4-6 oz., fair color, slight cracking, firm, u, fair set. Resistant to Fusarium. Good fruit size, fair quality and production.
Enterpriser (10)	Mainseason; determinate medium vine, fair foliage cover; fruit - globe, 4-5 oz., good color, slight cracking, firm, u, good set. Resistant to Fusarium. Fair fruit size, good quality and production.

Big Boy
Hybrid (3)

Mainseason; indeterminate large vine, good foliage cover; fruit - globe-flat, 4-7 oz., good color, moderate cracking, medium firmness, u+, poor set. Susceptible to Fusarium. Good fruit size, fair quality, unproductive.

Campbell 17 (4)

Early-mainseason; determinate medium vine, good foliage cover; fruit - globe, 4-6 oz., good color, no cracking, firm, smooth, u, good set, good flavor. Resistant to Fusarium. Good fruit size and production very good quality. Looks good for both fresh market and processing.

Campbell 146 (4)

Mainseason; semi-determinate large vine, good foliage cover; fruit - globe-flat, 4-6 oz., fair color, slight cracking, firm, u, fair set. Resistant to Fusarium. Good fruit size, fair quality and production.

Enterprise (10)

Mainseason; determinate medium vine, fair foliage cover; fruit - globe, 4-5 oz., good color, slight cracking, firm, u, good set. Resistant to Fusarium. Fair fruit size, good quality and production.

Control of Smut of Sweet Corn with Systemic Fungicides

James G. Kantzes
Department of Botany and Plant Pathology

Purpose and Objective

1. To determine the efficacy of three systemic fungicides used as seed treatments for the control of corn smut (Ustilago maydis).

Procedure

One-half pound lots of NK-199 sweet corn seed were treated prior to planting with systemic fungicides as follows:

1. Control
2. Vitavax @ 2 oz. per 100 lbs seed
3. Vitavax @ 4 oz. per 100 lbs seed
4. Vitavax @ 8 oz. per 100 lbs seed
5. G 696 @ 2 oz. per 100 lbs seed
6. G 696 @ 4 oz. per 100 lbs seed
7. Plantvax @ 4 oz. per 100 lbs seed
8. Plantvax @ 8 oz. per 100 lbs seed
9. Vitavax @ 4 oz. and Plantvax @ 4 oz. per 100 lbs seed
10. Vitavax @ 2 oz. and Plantvax @ 2 oz. per 100 lbs seed
11. G 696 @ 2 oz. and Vitavax @ 4 oz. per 100 lbs seed

The seed were planted in the field at Cheston-on-Wye on June 28, 1967 in single-row plots 33 feet long. The treatments were randomized in complete blocks with 5 replications. The test plots were located in an area which had been planted to corn for several years previously.

Results

None of the seed treatments showed any degree of phytotoxicity. Control data could not be obtained since corn smut did not develop in any of the plots, including the untreated control.

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Results

None of the seed treatments showed any degree of phytotoxicity. Control data could not be obtained since corn smut did not develop in any of the plots, including the untreated control.

Culture and Management Studies for the Production and Maintenance of Woody Plants (Maryland Agr. Expt. Sta. Project I-74 C).

C. B. Link and T. J. MacCubbin
Department of Horticulture

Purpose and Objective

The production of nursery stock is an important industry in Maryland, especially on the Eastern Shore, and the control of weeds is one of the major items of expense. This is particularly true of young plants. Fertility practices for such plants used by nurserymen are based largely on experience and observation without the help of experimentally conducted studies.

The first study established at Cheston-on-Wye under this project is one on the interaction of fertilizer application and a herbicide, casoron, on the growth, survival and weed control of 8 kinds of woody ornamental plants. It has as its objectives the following:

A. to evaluate the effect of increased fertility on plants receiving herbicide and charcoal dip treatments.

B. to observe weed control response to the herbicide used.

C. to evaluate the charcoal root dip as a method of reducing herbicide damage to ornamental plants.

D. to evaluate the practicality of the dip method for commercial nursery operations.

Procedure

Eight types of woody ornamental plants were selected for this study to represent trees, shrubs and broadleaf evergreens using kinds that at least in smaller sizes would be transplanted essentially as bare-root plants. Lining out sized plants were selected. On April 25, 1967 forty plots, 12' x 24', were established with buffer strips between plots. Each plot received a specific herbicide and fertilizer treatment for a total of 20 combinations with each

treatment combination being duplicated for a total of 40 plots. The herbicide (casoron) treatments were at the rate of 0, 2, 4, 8, and 16 lbs per acre and fertilizer (10-6-4) treatments at 0, 250, 500, 1,000 lbs per acre. The fertilizer was broadcast and rototilled into the soil after which the herbicide was broadcast and hand raked into the upper one inch. Immediately after the plots were prepared, the initial planting of 5 plants each of Cornus florida, Abelia grandiflora, Ilex crenata and Weigelia sp. was made in each plot. The root system of each plant was treated before planting as follows: 2 plants dipped in a slurry of finely powdered steam activated charcoal, 1 plant into a mud slurry and 2 plants not dipped. On May 2, 1967 additional plants were planted to complete each plot; these included Quercus robur, Quercus palustris, Acer rubrum, and Malus floribunda cv. Normandy. These plants were also given the several dip treatments.

Results

Weed Control

Data on weed control was recorded at several intervals throughout the summer as the time required to hand hoe each plot. Plots receiving the higher levels of casoron showed significant decrease in weeding time, however, no treated plots were weed free. Herbicide activity was below a desirable level. The data and visual observations all indicate a need for improved herbicide application techniques.

Root Dip Treatments

Preliminary results indicate a decrease in plant injury when the charcoal root dip was applied. Plants in plots receiving the lower herbicidal levels, 2 and 4 pounds per acre, and charcoal root dip treatment in most instances were completely free from herbicidal injury, while the plants not dipped were often severely chlorotic and stunted. Plants receiving 8 or 16 pounds of herbicide and charcoal root dip showed only slight damage, but less than the control plants.

Observations of roots showed that fibrous rooted plants as the Ilex crenata were matted together by the charcoal dip and this may have interfered with normal root growth and ability to become well-established. This needs further study.

Fertilizers

At present no significant decrease in injury or growth response has been observed due to fertilizer treatments. This will require an additional season to become apparent.

Table. The average amount of new growth per plant, in centimeters, of Pin Oak, Quercus palustris, and Crabapple, Malus floribunda cv. Normandy.

		Casoron, lbs/A									
		0		2		4		8		16	
Fertilizer Lbs/A	Charcoal treatment	Pin Oak	Crab-apple	Pin Oak	Crab-apple	Pin Oak	Crab-apple	Pin Oak	Crab-apple	Pin Oak	Crab-apple
0	Dipped	15.0	96.7	41.3	105.0	16.6	130.5	20.6	131.2	45.3	119.7
	Not Dipped	19.3	84.7	39.3	67.2	16.0	85.5	18.3	34.2	27.3	70
250	Dipped	20.0	90.5	20.3	137.5	41.3	118.2	18.3	85.2	18.3	64
	Not Dipped	21.3	84.2	19.0	90.5	33.0	110	13.6	12.7	11	43.7
500	Dipped	27.5	114.2	30.6	113.5	27.3	118.7	34.3	136.5	22	100.7
	Not Dipped	20.0	106.75	19.6	98.5	14.0	108.7	13.6	67.7	0	20.7
1000	Dipped	25.0	84.0	19.0	105.5	27.3	97.2	45.3	124	19.6	128.5
	Not Dipped	19.0	121.7	14.6	87.7	31.6	123.5	7.3	79	2.6	13.7

Summary

Charcoal dips of young plants at the time of planting reduced the damage to plants from any excess in the application of the herbicide casoron.

Additional time is required to observe differences in growth due to fertilizer applications.

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Chemical Weed Control Studies in Sweet Corn, 1967

J. D. Long
Department of Horticulture

Purpose and Objectives

1) To evaluate selected herbicides and herbicide combinations for controlling major weed species in sweet corn. 2) To determine the effectiveness of chemical weed control on silt loam. 3) To develop information for guiding weed control recommendations to Maryland sweet corn growers.

Procedure

The study was conducted at Cheston-on-Wye on Mattapex silt loam. NK-199 sweet corn was planted May 19, 1967. The 7 treatments shown in Table 1 were arranged in randomized complete blocks with 4 replications. Individual plots contained 4 rows 30 inches apart and 25 feet long. Herbicides were broadcast over the entire plot but only the center 2 rows were used for records.

All herbicide treatments were applied May 29 with a tractor-mounted sprayer calibrated for 50 gallons per acre. By this time many weeds had emerged and were 1/4 - 1/2 inch tall. The soil was moist when treatments were applied and light rain (approx. 1/4 inch) fell within 2 hours. Plots received no cultivation. The major weed species were common ragweed, carolina horsenettle, giant foxtail, velvet-leaf, morning glory, smartweed, and cocklebur in approximate order of importance. Some nutsedge occured in the plots but was disregarded in the weed control ratings. The corn was just about ready to emerge when treatments were applied.

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Data indicating the performance of the herbicide treatments are shown in

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Table 1. Atrazine at 2 pounds active per acre effectively controlled all weeds except giant foxtail and carolina horsenettle. A combination of atrazine at 1 pound and CP-31393 at 3 pounds or atrazine and linuron at 1 pound each provided better control than atrazine alone. Atrazine plus SD-11831 and atrazine plus linuron at 0.5 pounds each failed to give acceptable full-season weed control. The CP-31393 and linuron combination gave control comparable to the standard atrazine treatment. Jimson weed and morning glory were not completely controlled. None of the chemical treatments caused visible injury to the crop.

Table 1. Effect of pre-emergence herbicide treatments on weed control in sweet corn, 1967.

	Treatment 1/	Rate lb. ai/A	Weed Control 2/ 6/28	8/9
1.	Atrazine 80W	2	8.3	7.5
2.	Atrazine 80W + CP-31393 65W	1 3	9.5	8.8
3.	Atrazine 80W + Linuron 50W	1 1	10.0	9.3
4.	Atrazine 80W + Linuron 50W	0.5 0.5	8.0	6.8
5.	Atrazine 80W + SD-11831	1 0.5	7.0	6.3
6.	CP-31393 65W + Linuron 50W	3 1	8.8	7.5
7.	Control	---	2.0	0

1/ Treatments were applied 5/29 when corn was about to emerge. Many weeds had already emerged and were 1/4 - 1/2" tall. Soil was moist when treatments were applied and light rain (approx. 1/4") fell within 2 hours. The corn was seeded 5/19.

2/ Rated 0 to 10 (10 represents nearly perfect control).

Summary

Four herbicide treatments provided good weed control in sweet corn without crop injury. Two herbicide combinations provided better control than the standard atrazine treatment used alone.

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2. Atrazine 80W + CP-31393 85W	1 3	9.5	8.8
3. Atrazine 80W + Linuron 50W	1 1	10.0	9.3
4. Atrazine 80W + Linuron 50W	1 0.5	8.0	6.8
5. Atrazine 80W + SD-11831	1 0.5	7.0	6.3
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Nitrogen-Phosphorus-Potassium Fertilization of Sweet Corn in Relation to Nutrient Levels in the Soil and in the Plant - (Md. Agr. Exp. Sta. Project Q-74)

C. W. Reynolds
Department of Horticulture

Basic information on the response of crops to fertilizers as related to nutrient levels in the soil and in the plant is necessary for proper interpretation of soil tests and plant tissue tests. Ideally, experimental data are needed for the many types of soil and kinds of plants to be grown. Response data of this type are very limited for vegetable crops under Maryland conditions. This experiment was designed to obtain such information for sweet corn on one important soil type for the Eastern Shore area. The objective is:

1) To determine the effects of varying amounts of N, P, and K fertilizers on the yields of sweet corn, on nutrient levels in the soil and plant, and on mineral uptake by sweet corn plants.

Procedure

Three levels each of N, P_2O_5, and K_2O (40, 80, and 120 lbs/acre) were applied to the Mattapex silt loam soil in a factorial experiment in all combinations. The required amount of nutrients for each treatment combination was applied as described below. All plots received 250 lbs/A of 8-16-16 in bands at planting time. The remainder of the phosphate and potash was disked in prior to planting. One-half of the nitrogen was sidedressed at 4 weeks after planting, with the remainder applied prior to and/or at the time of planting as shown in the table below.

The corn was planted on May 19, 1967, but a poor stand was obtained and it was disked under and replanted on June 22. Rows were 30 inches apart and a stand of about 1 plant per foot of row was intended. The stand even at the second planting

was lower than desired and was somewhat irregular. The variety NK-199 was used.

Table. Rates and Times of Application of Fertilizer for Sweet Corn. Cheston-on-Wye, 1967

Nutrient	Total Rate, lbs/Acre	Times and Methods of Application		
		Disked In lbs/A	At Planting lbs/A	Sidedressed lbs/A
N	40	0	20	20
	80	20	20	40
	120	40	20	60
P_2O_5	40	0	40	0
	80	40	40	0
	120	80	40	0
K_2O	40	0	40	0
	80	40	40	0
	120	80	40	0

Results

The soil tests in the spring of 1967 prior to application of fertilizer showed the following nutrient levels:

MgO	99 (medium)	K_2O	125 (medium)
P_2O_5	147 (high)	pH	5.8

A severe infestation of European corn borer occurred during late July and early August, causing serious damage to stalks and later to the ears. High clearance equipment for spraying corn was not available and as a result the yield of corn was low, averaging about 3 tons per acre. There were no differences in yield among the fertilizer treatments.

Summary

A fertilizer test with 3 levels each of N, P_2O_5, and K_2O (40, 80 and 120 lbs/A) was conducted on Mattapex silt loam soil testing medium in potash and magnesium and high in phosphate at the beginning of the experiment. There were no significant differences in yield as a result of fertilizer treatments, due in part to

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Table. Rates and Times of Application of Fertilizer for Sweet Corn. Cheaton-on-Rye, 1957

Nutrient	Total Rate, lbs/Acre	Times and Methods of Application	
		Disked In lbs/A	At Planting lbs/A	Sidedressed lbs/A
N	40	0	20	20
	80	20	20	40
	120	40	20	60
P_2O_5	40	0	40	0
	80	40	40	0
	120	80	40	0
K_2O	40	0	40	0
	80	40	40	0
	120	80	40	0

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serious damage from corn borers. It is planned to continue the tests next year on the same plots. Additional soil tests will be made in the spring of 1968 and nutrient levels in the corn plants will be determined by tissue tests.